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GB 1599422 GB 1475799 GB 1398544
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(58) Field of search
A4L
A4M

(54) Seat with variable support

(57) By periodically changing the support provided by a seat, discomfort for persons, such as vehicle drivers, who are required to remain seated in the same altitude for long periods can be alleviated and to this end there is disclosed a combination of a seat having a plurality of individually inflatable portions (1, 6) for supporting respective parts of the anatomy of a person seated in the seat, and flow control means (3/4) operated by a programmer (8). In use the inflatable portions (1, 6) are connected via the fluid flow control means (3/4) to a source of pressurised fluid (5). The programmer (8) controls fluid flow via the flow control means (3/4) such that the individual inflatable portions (1, 6) are periodically inflated and deflated to vary the support provided thereby to a person seated in the seat.

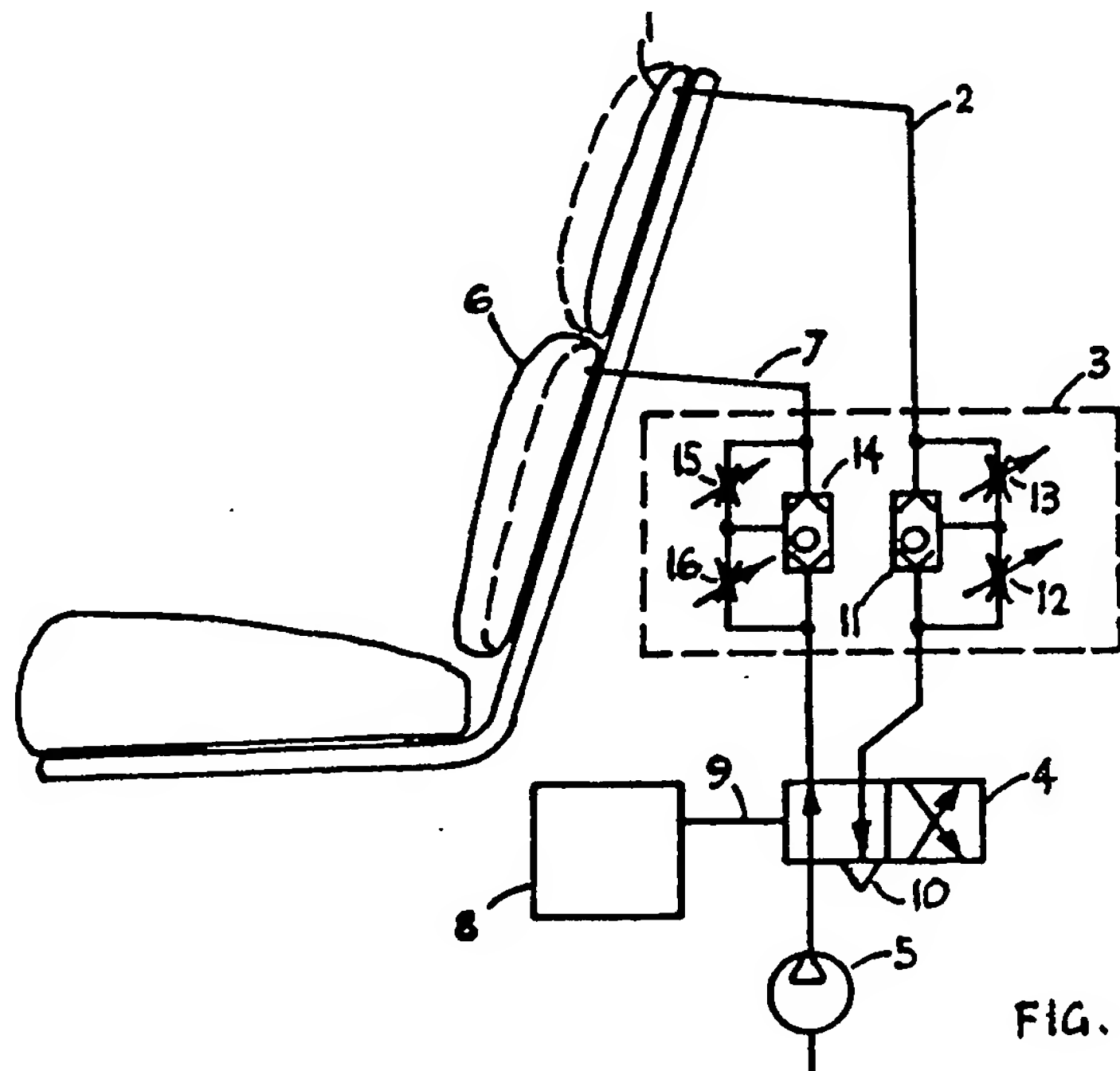


FIG. 1.

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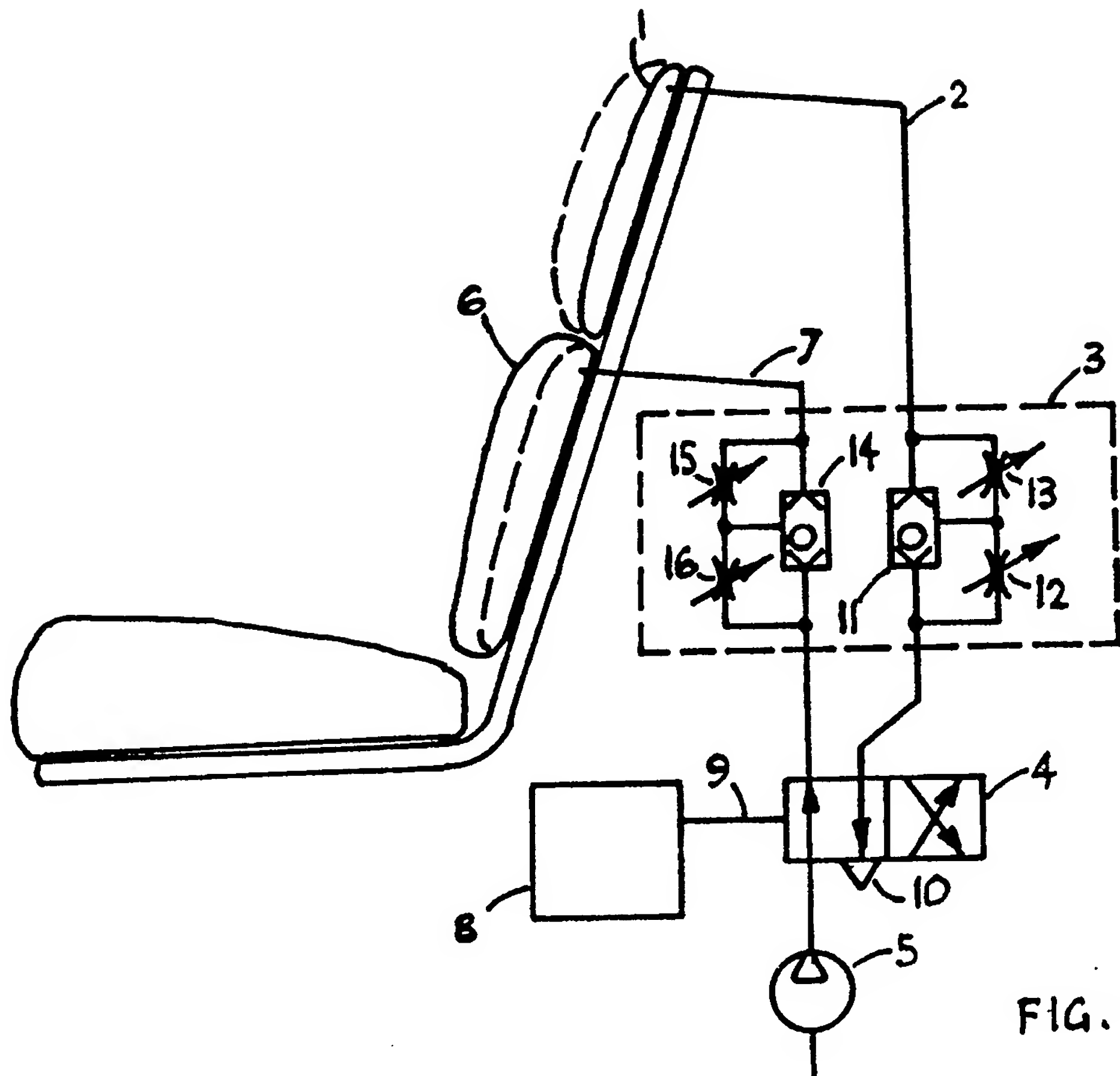


FIG. 1.

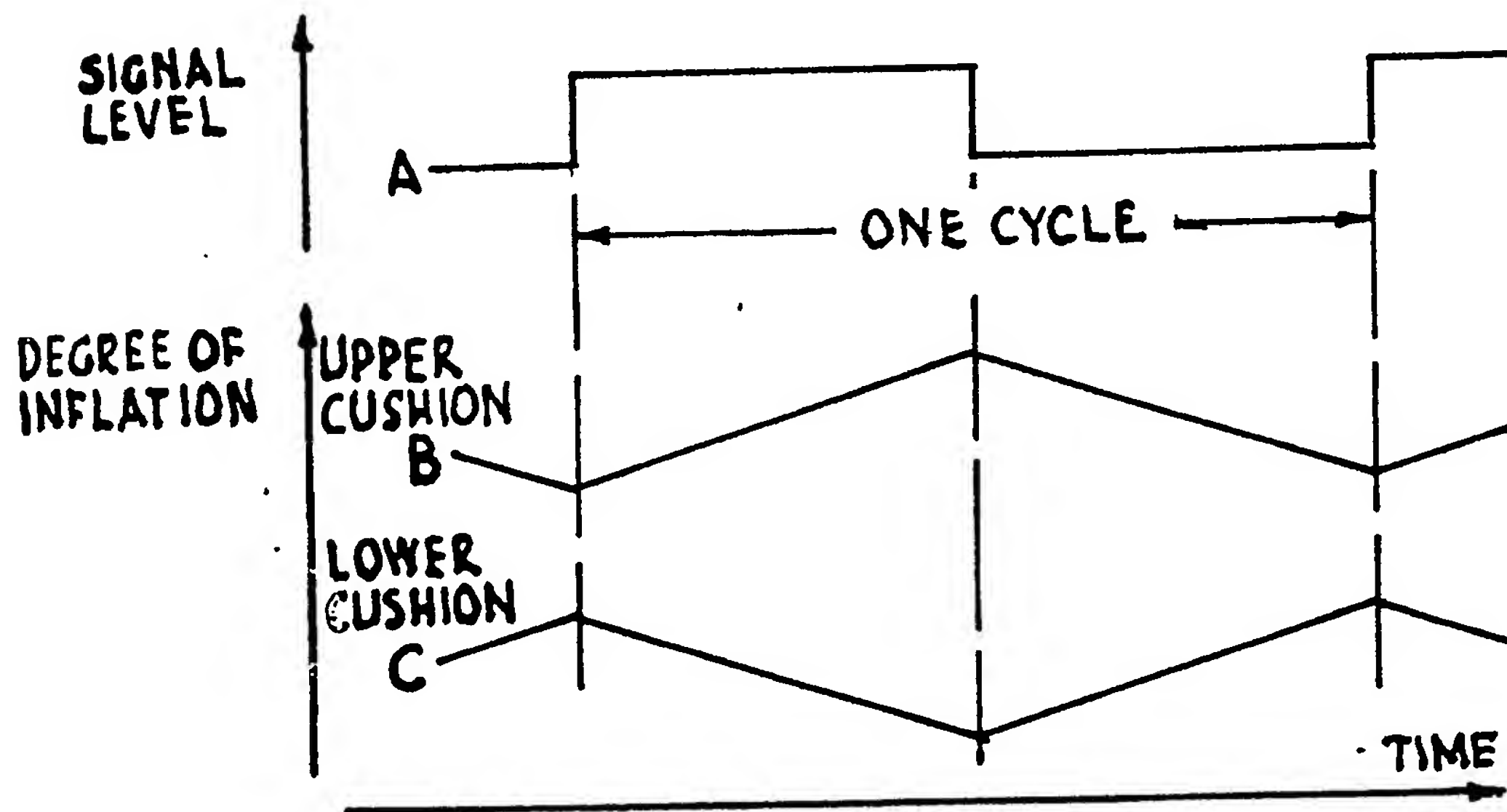


FIG. 2.

SPECIFICATION

Seat with variable support

5 Persons, such as vehicle drivers for example, who are required to remain seated in the same attitude for long periods eventually suffer discomfort and feel compelled to shift their position in order to alleviate it.

10 The invention is a system whose purpose is to reduce discomfort of people who remain seated and particularly discomfort from pain in the back.

15 *Figure 1* shows the section through a seat together with a diagram of the rest of the system. The symbols used here to show air ducts and components are taken from British Standard 2917.

20 The back of the seat is provided with two pneumatic cushions of which either or both may consist of several interconnected compartments and may have external padding.

25 The upper cushion 1 is connected by means of flexible tube 2 through the valve array 3 to the first outlet port of directional control or diverter valve 4. The lower cushion 6 is connected by flexible tube 7 through the valve array 3 to the second outlet port of valve 4. A compressor 5 supplies air at suitable pressure to the inlet port of valve 4.

30 Valve 4 is essentially a binary, that is to say two-state, device and it is controlled by any one of several possible types of programmer 8 whose construction and principles are already well known. The output of the programmer is also binary as illustrated in a graphical manner by line A in Fig. 2. The programmer 8 is connected to valve 4 by a suitable mechanical, pneumatic or electrical link 9 according to the types of components used, consequently the state of the valve 4 follows precisely the state of the output of programmer 8.

40 When the system according to the invention is working air flows from the compressor to the inlet port of the valve 4 where it is diverted either to the first outlet port or to the second according to the state of the valve. Flow continues through the valve array 3 to one or other of flexible tubes 2 or 7 and cushions 1 or 6; whichever cushion is inflating the other is deflating as air flows out of it through valve array 3, valve 4 to the vent 10.

50 The valve array 3 is provided to allow adjustment to the rates of flow of air into and out of the cushions. Shuttle valve 11 and variable restrictors 12 and 13 are arranged so that flow into the upper cushion 1 passes through shuttle valve 11 and variable restrictor 13. Flow out of the same cushion towards the vent passes through shuttle valve 11 and variable restrictor 12.

60 In a similar manner flow into and out of the lower cushion 6 passes through shuttle valve 14 and through variable restrictor 15 to inflate or through restrictor 16 to deflate.

70 By these means the flow into and out of both the cushions is separately adjustable by the occupant of the seat who will ideally achieve the optimum performance shown by the full lines B and C in Fig. 2. Both these lines indicate the inflation of the cushions against a scale of time and show that while one cushion inflates the other deflates. Lines B and C of Fig. 2 show also that there is an upper limit of inflation which depends on the pressure of air coming from the compressor and a low limit which is atmospheric pressure.

75 The object of the invention is realised by operating the system in the manner described continuously while the seat is occupied.

80 It has been found by experience that the settings of the variable restrictors are not critical when the air pressure at the compressor is between 0.07 bar (1 psi) and 0.1 bar (1½ psi) and the cycle time is between ten minutes and twenty minutes. Relief from discomfort is obtained even if the cushion state dwells on either limit for several minutes, (in consequence of under restricting the flow) or even if the cushion state fails to reach one or both potential limits (in consequence of over restricting the flow).

85 The system may be extended to enhance the comfort of the occupier by providing a pair of pneumatic cushions in the seat and connecting them respectively to branches in the flexible tubes 2 and 7. The two seat cushions may be arranged side by side with the effect that the thighs of the occupant are given extra support alternately. Alternatively the cushions may be arranged one behind the other so that there is alternating support for the thighs and pelvis. If the latter arrangement is adopted it is better to connect the forward cushion to the branch in the flexible tube 7 and the rearward cushion to the branch in duct 2.

CLAIMS

110 1. In combination, a seat having a plurality of individually inflatable portions for supporting respective parts of the anatomy of a person seated in the seat, and flow control means operated by a programmer; the inflatable portions being connectible via the fluid flow control means to a source of pressurised fluid, and the programmer being for controlling fluid flow via the flow control means such that, in use, individual inflatable portions are automatically periodically inflated and deflated to vary the support provided thereby to a person seated in the seat.

120 2. The combination as claimed in claim 1, wherein said portions consist of one or more pairs of portions, the two portions of the or each pair being adjacent one another; and wherein the programmer operates to inflate one portion of the or each pair whilst the other portion of this pair is deflating, and to deflate the one whilst the other is inflating.

3. The combination as claimed in claim 1 or 2, wherein there is a pair of said portions disposed in the back of the seat.
4. The combination as claimed in claim 3, wherein one portion in the seat back is disposed above the other portion in the seat back.
5. The combination as claimed in claim 1, 2, 3 or 4, wherein there is a pair of said portions disposed in the base of the seat.
6. The combination as claimed in claim 5, wherein the portions in the base of the seat are disposed side by side.
7. The combination as claimed in claim 5, wherein the portions in the base of the seat are disposed one behind the other.
8. The combination as claimed in claims 3 and 5 with or without any one of claims 4, 6 or 7, wherein one of the portions in the back of the seat is connected to inflate or deflate with one of the portions in the base of the seat, and wherein the other of the portions in the back of the seat is connected to inflate or deflate with the other of the portions in the base of the seat.
9. In combination, a seat and flow control means operated by a programmer, substantially as hereinbefore described with reference to the accompanying drawing.

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